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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,716	03/03/2004	Masayoshi Takahashi	Q79574	2616
23373 7590 11/12/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER				
BOYER, RANDY				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/790,716

**Applicant(s)**

TAKAHASHI ET AL.

**Examiner**

RANDY BOYER

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 September 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.  
4a) Of the above claim(s) 10-17 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-9 and 18 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Examiner acknowledges Applicant's response filed 25 September 2008 containing remarks.
2. Claims 1-18 are pending. Claims 10-17 stand withdrawn as being drawn to a non-elected invention.
3. The previous rejections of claims 1-9 and 18 under 35 U.S.C. 103(a) are maintained. The rejections follow.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
7. Claims 1-9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (JP 2003-041275 A).
8. With respect to claims 1, 2, 7, and 18, Arai discloses a method for making gas hydrate comprising: (a) generating bubbles in an aqueous solution (see Arai (English translation), page 10, lines 32-36); and (b) spontaneously generating hydrate nuclei by self-compression and collapsing of the bubbles (see Arai (English translation), page 10, lines 32-36).

Arai does not explicitly disclose wherein the bubbles are "ultrafine" bubbles, or wherein a high concentration of gas molecules is generated around the bubbles in the aqueous solution.

However, Arai is not specifically limited with respect to the size of bubbles generated by his apparatus and process. Moreover, one generally cannot establish

patentability over a prior art process/apparatus by merely reciting differences in relative size (e.g., production of “ultrafine” bubbles) unless such claimed size difference would result in new or unexpected results. See generally MPEP § 2144.04(IV). Finally, although not explicitly referred to in Arai, the process/apparatus of Arai would necessarily result in “a high concentration of gas molecules [being] generated around the bubbles in the aqueous solution” by the very nature of the gas hydrate being formed in the immediate vicinity of the bubble (see Arai (English translation), page 10, lines 32-36).

9. With respect to claim 3, the ascending rate of bubbles would necessarily depend on the size of the bubble. As explained *supra* at paragraph 8, Arai is not specifically limited with respect to the size of bubbles generated by his process/apparatus.

10. With respect to claims 4-6, Arai discloses wherein the bubbles are generated under pressure (see Arai (English translation), page 5, lines 23-26) and wherein the bubbles are dissolved in aqueous solution (see Arai (English translation), page 10, lines 32-36).

11. With respect to claims 8 and 9, Arai discloses wherein the bubbles are generated by a swirling two-phase flow process (see Arai (English translation), entire document) and wherein they are generated by what can reasonably be described as a “bell”-shaped bubble generator (see Arai (English translation), Drawing 1).

12. Claims 1-9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ida (JP 2002-356686 A).

13. With respect to claims 1, 2, 7, and 18, Ida discloses a method for making gas hydrate comprising: (a) generating bubbles in an aqueous solution (see Ida (English translation), page 4, lines 23-38); and (b) spontaneously generating hydrate nuclei by self-compression and collapsing of the bubbles (see Ida (English translation), page 4, lines 23-38).

Ida does not explicitly disclose wherein the bubbles are "ultrafine" bubbles, or wherein a high concentration of gas molecules is generated around the bubbles in the aqueous solution.

However, Ida is not specifically limited with respect to the size of bubbles generated by his apparatus and process. Moreover, one generally cannot establish patentability over a prior art process/apparatus by merely reciting differences in relative size (e.g., production of "ultrafine" bubbles) unless such claimed size difference would result in new or unexpected results. See generally MPEP § 2144.04(IV). Finally, although not explicitly referred to in Ida, the process/apparatus of Ida would necessarily result in "a high concentration of gas molecules [being] generated around the bubbles in the aqueous solution" by the very nature of the gas hydrate being formed in the immediate vicinity of the bubble (see Ida (English translation), page 7, lines 10-20).

14. With respect to claim 3, the ascending rate of bubbles would necessarily depend on the size of the bubble. As explained *supra* at paragraph 13, Ida is not specifically limited with respect to the size of bubbles generated by his process/apparatus.

15. With respect to claims 4-6, Ida discloses wherein the bubbles are generated under pressure (see Ida (English translation), page 9, lines 6-10) and wherein the

bubbles are dissolved in aqueous solution (see *Ida* (English translation), page 9, lines 6-10).

16. With respect to claim 8, *Ida* discloses wherein the bubbles are generated by a swirling two-phase flow process (see *Ida* (English translation), entire document).

17. With respect to claim 9, *Ida* is not specifically limited with respect to the shape of the bubble-generating apparatus. In this regard, Examiner notes that mere changes in shape of a prior art apparatus generally cannot serve as the basis for patentability in the absence of new or unexpected results. See MPEP § 2144.04(B).

18. Claims 1-9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato (JP 2003-055677 A).

19. With respect to claims 1, 2, 7, and 18, Kato discloses a method for making gas hydrate comprising: (a) generating bubbles in an aqueous solution (see Kato (English translation), page 6, lines 14-44); and (b) spontaneously generating hydrate nuclei by self-compression and collapsing of the bubbles (see Kato (English translation), page 6, lines 14-44).

Kato does not explicitly disclose wherein the bubbles are “ultrafine” bubbles, or wherein a high concentration of gas molecules is generated around the bubbles in the aqueous solution.

However, Kato is not specifically limited with respect to the size of bubbles generated by his apparatus and process (see Kato (English translation), page 6, lines 19-24). Moreover, one generally cannot establish patentability over a prior art process/apparatus by merely reciting differences in relative size (e.g., production of

"ultrafine" bubbles) unless such claimed size difference would result in new or unexpected results. See generally MPEP § 2144.04(IV). Finally, although not explicitly referred to in Kato, the process/apparatus of Kato would necessarily result in "a high concentration of gas molecules [being] generated around the bubbles in the aqueous solution" by the very nature of the gas hydrate being formed in the immediate vicinity of the bubble (see Kato (English translation), page 6, lines 26-32).

20. With respect to claim 3, the ascending rate of bubbles would necessarily depend on the size of the bubble. As explained *supra* at paragraph 19, Kato is not specifically limited with respect to the size of bubbles generated by his process/apparatus.

21. With respect to claims 4-6, Kato discloses wherein the bubbles are generated under pressure (see Kato (English translation), page 6, lines 14-16) and wherein the bubbles are dissolved in aqueous solution (see Kato (English translation), page 6, lines 26-32).

22. With respect to claim 8, Kato discloses wherein the bubbles are generated by a swirling two-phase flow process (see Kato (English translation), entire document).

23. With respect to claim 9, Kato is not specifically limited with respect to the shape of the bubble-generating apparatus. In this regard, Examiner notes that mere changes in shape of a prior art apparatus generally cannot serve as the basis for patentability in the absence of new or unexpected results. See MPEP § 2144.04(B).



***Response to Arguments***

24. Applicant's arguments filed 25 September 2008 have been fully considered but they are not persuasive.

25. Examiner understands Applicant's principal arguments to be:

- I. Arai does not disclose self-compression as required by Applicant's claims.
- II. It is impossible to generate microbubbles having diameter of 50  $\mu\text{m}$  or less using Arai's method.
- III. No self-compression occurs and no hydrated nuclei are generated in the process of Arai.
- IV. Ida does not disclose self-compression.
- V. Gas bubbles with diameter of 50  $\mu\text{m}$  or less cannot be generated using Ida's method.
- VI. Kato does not disclose the concept of self-compression.
- VII. Using Kato's techniques, it is impossible to obtain microbubbles having diameter of 50  $\mu\text{m}$  or less.

26. With respect to Applicant's first, third, fourth, and sixth arguments, Examiner notes: (1) wherein Arai discloses gas in the air bubbles being "consumed" as a hydrate (see Arai (English translation), page 10, lines 32-36); (2) wherein Ida discloses the "dissolution" of material gas, thus generating a gas hydrate (see Ida (English translation), page 4, lines 23-38); and (3) wherein Kato discloses the "simultaneous" formation of gas hydrates upon dissolution of the gas bubble (see Kato (English translation), page 14, lines 35-40). Examiner submits that all of these are analogous and equivalent to Applicant's process step (b) during which hydrates are "spontaneously

generated" by "self-compression" and "collapse" of the gas bubbles that are the hydrate precursors.

27. With respect to Applicant's second and seventh arguments, Examiner notes that both Arai and Kato disclose varying process conditions so as to vary the size of the bubbles produced and hydrate generated (see Arai (English translation), page 17, lines 9-19) (see Kato (English translation), page 15, lines 1-6). Thus, the person having ordinary skill in the art would easily be able to arrive at Applicant's claimed "ultrafine bubbles having diameter of 50  $\mu\text{m}$  or less" by simply varying the process conditions as suggested by Arai and Kato. In this regard, Applicant has not put forward any convincing explanation for why it would be allegedly "impossible" to form bubbles having diameter of 50  $\mu\text{m}$  or less by following the method of Arai and Kato.

28. With respect to Applicant's fifth argument, Ida is not specifically limited with respect to the size of bubbles generated by his apparatus and process. Moreover, one generally cannot establish patentability over a prior art process/apparatus by merely reciting differences in relative size (e.g., production of "ultrafine" bubbles) unless such claimed size difference would result in new or unexpected results. See generally MPEP § 2144.04(IV). In this regard, Applicant has not put forward any evidence establishing new or unexpected results arising from the generation of "ultrafine" bubbles having diameter of 50  $\mu\text{m}$  or less. In addition, Applicant has not put forward any convincing explanation for why it would be allegedly "impossible" to form bubbles having diameter of 50  $\mu\text{m}$  or less by following the method of Ida.

***Conclusion***

29. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 10:00 A.M. to 7:00 P.M. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB

/Glenn A Caldarola/

Acting SPE of Art Unit 1797